



# VIRGINIA

## COVID-19 Update March 25<sup>th</sup>, 2021

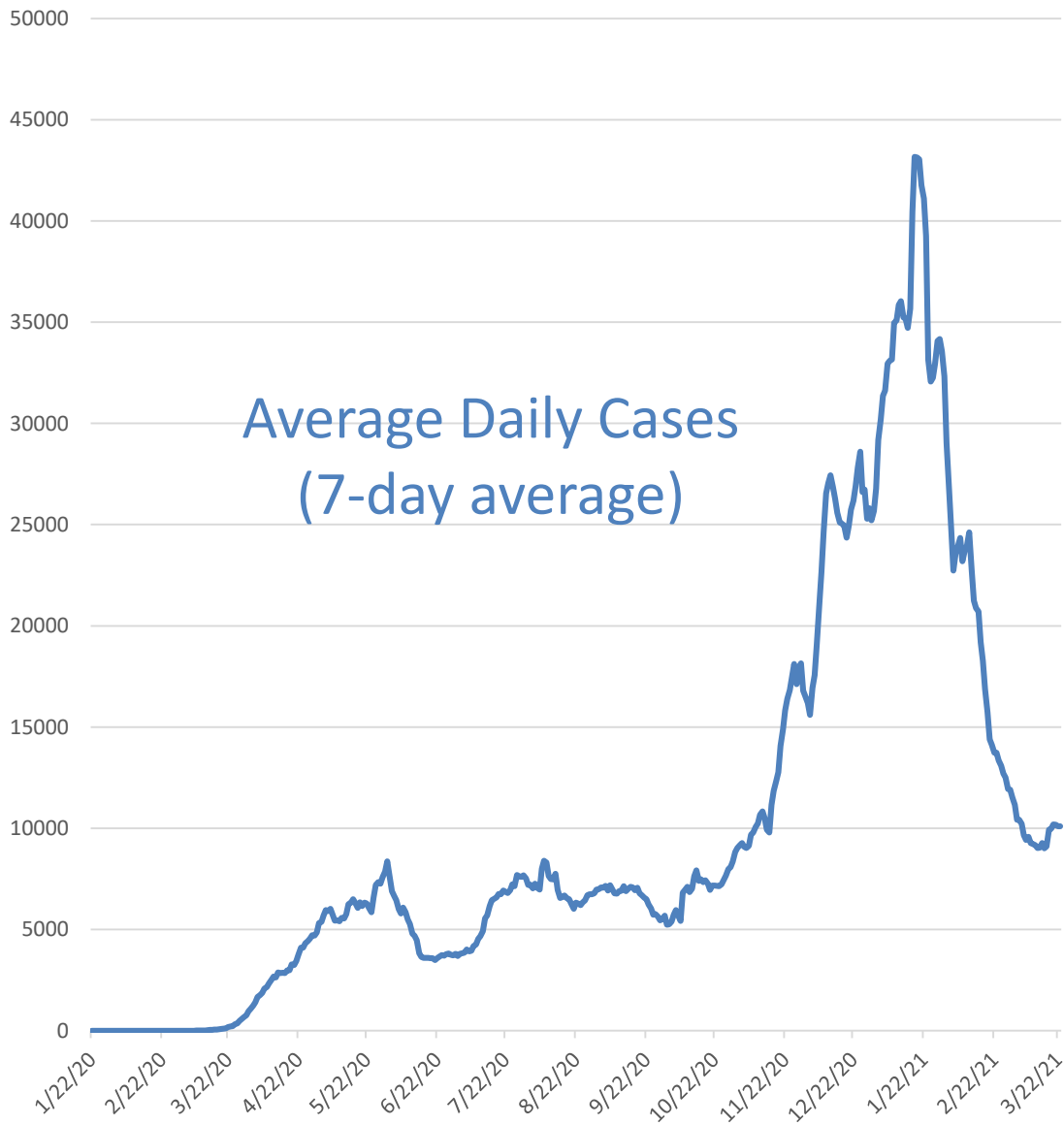
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A team of RAND researchers was asked by the Commonwealth of Virginia to review available information on COVID-19 models of the Commonwealth to determine the strengths and weaknesses of each model and their relevance to decisionmaking. The information in this presentation is intended to keep policymakers abreast of the latest findings of the research team.

This research was sponsored by the Commonwealth of Virginia and conducted by the RAND Corporation. RAND is a research organization that develops solutions to public policy challenges to help make communities throughout the world safer and more secure, healthier and more prosperous. RAND is nonprofit, nonpartisan, and committed to the public interest. For more information, visit [www.rand.org](http://www.rand.org).



# Bottom Line Up Front



**Confirmed cases** have risen slightly to 1,453 per day (+13%)

- This appears to have plateaued above the peaks from the spring and summer waves

**COVID hospitalizations** have continued to decline and are currently at 973 (-10%)

**COVID tests** are being administered in smaller numbers since the winter

- The test positivity rate has increased from 5.4 percent last week to 7.5 percent

**Vaccination** is continuing to increase rapidly (+1.5 percentage points fully vaccinated and +1.2 percentage points partially vaccinated)

**Despite growth in the share of the population vaccinated, case rates are increasing**

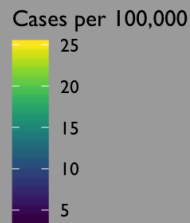
- The variants of concern may be increasing the case numbers
- Hospitalizations may be declining due to the older population being vaccinated



# Case levels have stabilized with some increases

## CASE COUNT

Source: VDH



**Yellow** indicates at least 25 cases per 100,000

### Case levels have increased across the Commonwealth

- 72 percent of counties have fewer than 20 cases per 100,000 (77 percent last week)
- 18 percent of counties have fewer than 10 cases per 100,000 (30 percent last week)

These data were updated March 24<sup>th</sup> and represent a seven-day average of the previous week

# Case levels are converging across neighboring states

Over the last 7 days, Virginia had 17.1 new confirmed cases per day per 100,000 (+13% from last week)


**Very high case loads (>20): None**

## High case loads (10-20):

- West Virginia (19.9 new cases per 100k, +14% from last week)
- Tennessee (18.7, +1%)
- Maryland (16.4, +15%)
- North Carolina (16.1, +3%)
- District of Columbia (15.9, -3%)
- Kentucky (14.7, -17%)

**Lower case loads (<10): None**

These data were updated March 24<sup>th</sup> and represent a seven-day average of the previous week



# Thirteen percent of Virginians are fully vaccinated, and an additional eleven percent are partially vaccinated

Age	0-9	10--19	20-29	30-39	40-49	50-59	60-69	70-79	80+	Total
<b>Fully Vaccinated</b>	0	6,729	80,211	114,493	129,814	154,601	215,833	231,718	132,839	1,066,238
<b>% Full</b>	0.0%	0.6%	6.9%	9.8%	12.1%	13.7%	22.1%	37.7%	42.7%	12.5%
<b>Partially Vaccinated</b>	0	11,935	63,003	89,643	106,276	151,527	237,174	166,207	68,808	894,573
<b>% with Partial</b>	0.0%	1.1%	5.5%	7.6%	9.9%	13.5%	24.3%	27.1%	22.1%	10.5%
<b>Confirmed Cases</b>	26,318	62,670	114,257	96,921	87,593	86,231	59,457	32,350	23,608	589,405
<b>% Confirmed Cases</b>	2.6%	5.7%	9.9%	8.3%	8.1%	7.7%	6.1%	5.3%	7.6%	6.9%

Source: VDH, March 24<sup>th</sup>

## Vaccinations are being rolled out in Virginia

- 3,514,165 doses have been distributed as of March 24<sup>th</sup>
- Virginia has administered 2,140,673 out of 2,173,510 first doses
- Virginia has administered 1,086,040 out of 1,134,655 second doses

**At some point in the next month or two, vaccine supply will likely be less of a constraint, and growing the vaccination rates will rely on improving demand**



# Variants could increase the rate of spread

**The CDC has identified five variants of concern that spread more rapidly than the baseline variant and may also bypass immunity from vaccines or previous infection**

- B.1.1.7 is also known as the U.K. variant and has been found in Virginia and all neighboring states
- B.1.351 (“South African variant”) has been found in Virginia and most neighboring states
- P.1 (“Brazilian variant”) has been found in Maryland but not in other neighboring states
- B.1.427/B.1.429 (“California variants”) have not yet been reported in Virginia or neighboring states

**Additionally, there are three variants of interest**

- B.1.525/B.1.526 (“New York variant”) is estimated to spread more quickly than the baseline
- P.2 is another Brazilian variant that is estimated to be similar to P.1

**Testing will be key to tracking the variants**

- Banada et al. produced an RT-PCR screen for a set of mutations common to the B.1.1.7, B.1.351, and P.1 variants
- Spurbeck et al. describe the successful implementation of a wastewater-based epidemiology approach to monitor viral load including a PCR approach capable of detecting the mutations of the S protein characteristic of the B.1.1.7 variant
- Similarly, Graber et al. developed an approach for estimating the prevalence of B.1.1.7 using wastewater

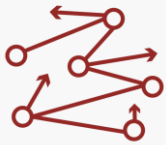
**Contact tracing could be particularly useful in containing outbreaks of these variants when paired with better surveillance**





# We've been monitoring recent, relevant literature

## **Holm Hansen et al. assessed the risk of reinfection based on PCR data from 4 million individuals in Demark**



- This population underwent 10.6 million tests over the course of two surges (one March to May and the other September to December)
- They assessed protection against repeat infection to be roughly 80 percent for the general population
- However, for the elderly, the protection was observed to be 47 percent



## **The American Psychological Association released the results of a survey of 3,013 U.S. adults on COVID stress**

- They documented a general increase in stress across demographic groups and among young people in particular
- 61 percent of adults reported undesired weight changes during the pandemic (a median increase of 15 pounds)



## **The CDC released a series of papers on COVID in schools**

- Verlenden et al. assessed how the well-being of children aged 5 to 12 and their parents varied based on the mode of schooling, and they found that those not in full-time, in-person school had lower mental and emotional well-being on average
- Dawson et al. studied the spread of COVID in 22 Missouri K-12 schools that implemented multiple mitigation strategies, and they found that schools with mask mandates, physical distancing, increased ventilation, and contact tracing had much lower levels of transmission than the broader community
- Hershov et al. examined the spread in 20 Utah elementary schools in December and January, and they found that both the schools had high mask compliance (but 3ft instead of 6ft of spacing) and that there were only five cases of school-associated transmissions



# What is next for modeling and analysis?

## **Pandemic modeling has greatly evolved over the last year**

- Initially, there was a dearth of high-quality data and the models were typically either SEIR-based or statistical
- As behaviors and policies changed, the models grew in complexity and hybrid/ensemble models are also used now
- Growing immunity, behavioral changes, and other factors will make modeling for the purpose of producing accurate forecasts particularly challenging in the coming months

## **At this stage of the pandemic, modeling and data analysis will be useful for addressing specific types of questions:**

- How might the spread change as new variants enter Virginia?
- Which segments of the population remain the most vulnerable?
- As vaccinations increase and case levels decline, which NPIs can be relaxed and when?
- Are there early warnings or triggers that should be monitored to help inform policy?

## **For other questions, surveillance is likely to be more useful:**

- How widespread are the variants in Virginia?
- How many cases should we expect in the next few weeks?

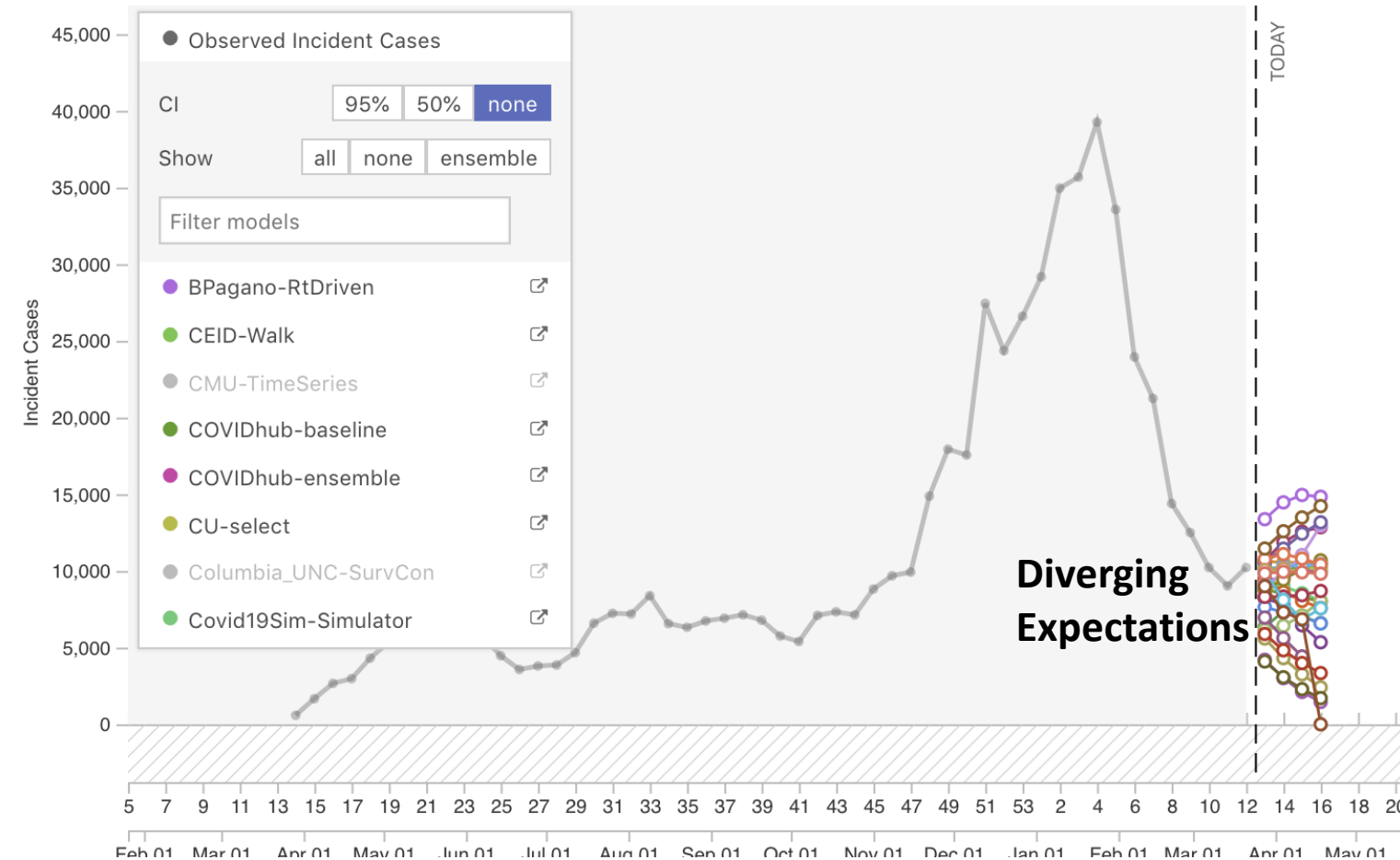
## **Robust, integrated testing programs are necessary to conduct effective surveillance**

- Data on the sampling approaches are useful to understand which areas and populations are well-covered versus under-covered
- Improving external access to data sources like wastewater testing or genomic sequencing could improve analysis





# The models are producing diverging forecasts



## The models differ on whether the rates will decline, level off, or increase

- These differences seem to be arising from different structural forms (SEIR-types predict declines, while others do not)
- It is not clear how the trade-off between the variants and vaccines is made in each model

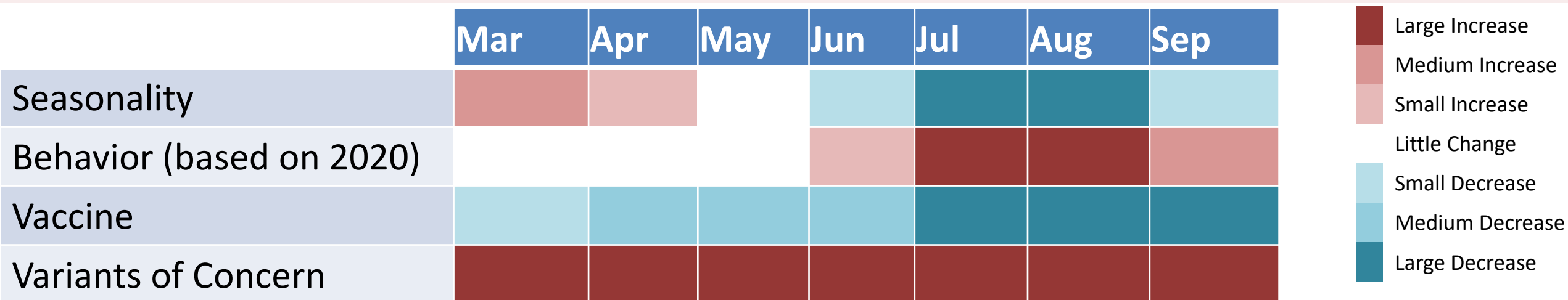
## Many of the model predictions lag the data

- This means that they match the trends in retrospect but not as forecasts

Source: COVID-19 Forecast Hub, <https://viz.covid19forecasthub.org/>  
Accessed March 17<sup>th</sup>



# The spread will be a race of vaccines versus variants




## There are several factors that will continue to drive the spread for the next few months

- Seasonal effects for COVID-19 appear to increase/decrease spread with cooler/hotter weather
- Behavioral changes appear to have increased the rate of spread during the summer of 2020 and may have a similar effect this summer
- The vaccines may begin to meaningfully slow the spread for certain populations, but maintaining the rate of vaccine administration will require a continuation of the high acceptance rate
- The Variants of Concern appear to have increased the rate of spread in Virginia, and future variants could also change the severity or the efficacy of vaccines

## There are some key unknowns about the current spread

- How many people have been infected with COVID-19 and have lingering protection?
- To what degree are people complying with best practices for prevention?



# Discussion and Questions